

## WORKPAD

### ADAPTIVE PEER-TO-PEER SOFTWARE INFRASTRUCTURE FOR SUPPORTING COLLABORATIVE WORK OF HUMAN OPERATORS IN EMERGENCY/DISASTER SCENARIOS



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WORKPAD aims at developing an innovative software infrastructure for supporting collaborative work of human operators in emergency scenarios. In such scenarios, different teams, belonging to different organizations, need to collaborate with each other to reach a common goal; each team member is equipped with portable devices and carries on specific assigned tasks.

In such a way we can consider the whole team as carrying on a process, and different teams collaborate through the „interleaving“ of all the different processes. Each team is supported by some back-end center, and the different centers need to cooperate at an inter-organizational level to reach an effective coordination among teams. The back-end centers thus form a virtual organization. The goal is to devise a 2-level framework for such scenarios: an integrated back-end peer-to-peer community, providing advanced services requiring high computational power, knowledge & content integration, and a set of front-end peer-to-peer communities, that provide services, mainly by adaptively enacting processes on mobile ad-hoc networks to human workers.

| The back-end community is constituted mainly by static/traditional computers, possibly arranged in a GRID, that interact in a P2P fashion. Such services, coarse-grained, require integration of data and

knowledge and content. The interesting aspect is that the community is inter-organizational (each peer belongs to a certain organization) and each system is enabled to act as service provider, requestor, or integrator. In particular, the integration should be dynamic, flexible, and non-intrusive.

| A single front-end community is constituted by the operators of a team, equipped with mobile devices, connected in an ad hoc and peer-to-peer fashion, that carry on a process, in which the adaptiveness to connection/task anomalies is fundamental.

Emergency organization Networks (in the back-end) and Collaborative Nomadic Teams (in the front-end) are considered as the basic New Working Environments (NWEs) that will be deployed upon innovative architectural and technological results.

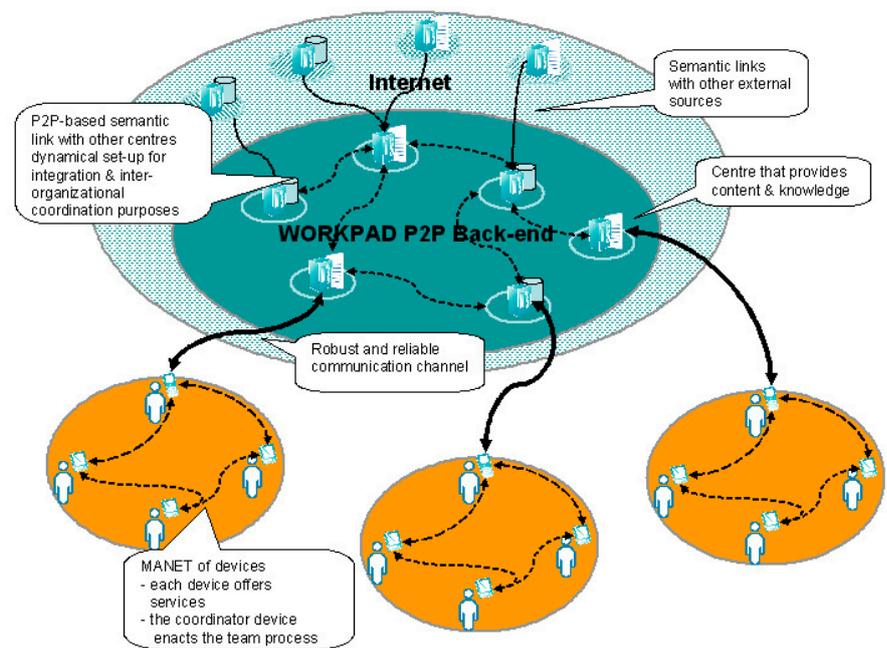
The figure on the reverse page shows the basic architecture of the WORKPAD system.

#### Research Challenges

In order to support such a complex scenario, from the provision of data & knowledge & content to front-end teams to their process executions, different research problems are going to be addressed:

- | Devising a 2-layer peer-to-peer architecture, including both the back-end peers and the front-end teams.
- | Investigating novel basic techniques for P2P data & knowledge & content integration, to be exploited on the back-end.

- | Investigating novel adaptive and context-aware techniques for cooperative work and workflow management among mobile devices on the front-end, with attention to usability issues.
- | Investigating how to exploit and leverage geo-referenced information, that plays an important role both (i) in the dynamic building of the back-end integration system and (ii) in the adaptive process management on the front-end teams.



- | Devising appropriate solutions around emergency communications, wireless communications and robust network links (i.e., connecting front-end and back-end) as they are key elements in helping emergency services respond in extreme situations.

### Project Partners

Università di Roma LA SAPIENZA (Co-ordinator) | Salzburg Research, Austria | Università di Roma TOR VERGATA, Italy | IBM Italia S.p.A., Italy | Technical University Vienna, Austria | APIF Moviquity S.A., Spain | Software602 A.S., Czech Republic | Regione Calabria - Settore Protezione Civile, Calabria - Homeland Security Department, Italy

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